Standardized Diagnosis and Treatment Consensus for Gallbladder Polyps (Specialty Standard of Dongguan Hepatobiliary Hospital)

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Gallbladder polyps are prevalent benign mucosal lesions of the gallbladder in hepatobiliary surgery, including cholesterol polyps, adenomatous polyps, and various premalignant proliferative lesions with occult malignant transformation risks. At present, clinical diagnosis and treatment of gallbladder polyps are heterogeneous across China. Surgical indications are commonly determined solely by polyp diameter, leading to two prominent clinical drawbacks: unnecessary cholecystectomy and missed high-risk lesions due to passive conservative observation.

To unify clinical pathways, standardize surgical indications, stratify malignant transformation risks accurately, prevent missed diagnosis and overtreatment, and implement the concepts of precision surgery, organ preservation and individualized care, Dongguan Hepatobiliary Hospital has formulated a replicable, implementable and promotable specialty standardized consensus. Established based on years of clinical experience in gallbladder-preserving surgery and integrating full-process systems of imaging evaluation, surgical intervention, pathological diagnosis and postoperative follow-up, this consensus standardizes in-hospital clinical practice and serves as a reference for primary medical institutions at all levels.

I. General Diagnosis and Treatment Principles

Our hospital completely abandons the traditional “size-only” criterion for gallbladder polyp management and establishes a multi-dimensional integrated system featuring size stratification, morphology priority, location differentiation, symptomatic reference, psychological consideration, pathological confirmation and organ preservation. The core clinical strategy consists of active intervention for high-risk lesions, precise screening for suspicious lesions, and standardized surveillance for low-risk lesions. Under the premise of ensuring medical safety and comprehensive prevention of gallbladder carcinogenesis, minimally invasive organ-preserving surgery is prioritized for patients with intact gallbladder structure, satisfactory contractile function and localized lesions. The one-size-fits-all cholecystectomy for benign lesions is avoided to minimize long-term metabolic complications and sustain patients’ long-term quality of life.

II. Core Risk Stratification Criteria (Morphology as the Highest Priority)

Polyp basal morphology is the primary indicator for judging lesion properties and malignant transformation risks, outweighing polyp size, and serves as the fundamental basis for clinical risk stratification and surgical decision-making.

1. Broad-based polyps

Broad-based polyps feature extensive mucosal attachment, which predisposes to mucosal dysplasia and invasive growth. They carry significantly higher risks of premalignant changes and malignant transformation and are defined as high-risk lesions requiring close surveillance or proactive surgical intervention.

2. Pedunculated polyps

Pedunculated polyps possess stable structural morphology. Most are benign cholesterol-derived lesions with low overall malignant potential. Nevertheless, a small proportion represents adenomatous premalignant lesions; therefore, regular imaging surveillance is mandatory rather than omitted.

Key Clinical Error Prevention Guidelines

Two widespread clinical misconceptions must be corrected. First, tiny polyps are not invariably benign; broad-based polyps smaller than 5 mm may develop mucosal dysplasia and retain malignant transformation potential. Second, large polyps do not equate to malignancy; most pedunculated polyps larger than 1 cm remain benign and can be radically treated via localized resection without cholecystectomy.

III. Size-Based Stratified Diagnosis and Treatment Specifications

1. Polyp diameter ＜ 5 mm (Predominantly low-risk, stratified surveillance)

Regular, narrow-based benign polyps require annual abdominal color Doppler ultrasonography. High-risk subtypes with broad bases, irregular surfaces and ill-defined borders require shortened follow-up intervals to dynamically monitor changes in polyp size, basal width and morphological texture. Surgical intervention is performed immediately once lesion enlargement, basal widening or morphological deterioration is identified.

2. Polyp diameter 5–9 mm (Borderline risk, individualized management)

The clinical principle of "morphology priority supplemented by humanized and individualized strategies" is applied. Surgical treatment is recommended for all broad-based polyps. Regular narrow-based polyps may be managed conservatively with semiannual abdominal ultrasonography. Surgical intervention is offered to patients with persistent cancer phobia, repeated medical consultation and severe psychological burden to eliminate psychological distress and latent lesion risks. Patients with stable mentality and good follow-up adherence may continue conservative surveillance, with prompt surgery indicated upon any lesion progression.

3. Polyp diameter ≥ 10 mm (High-risk screening, comprehensive assessment)

All polyps ≥ 10 mm are categorized for high-risk screening. Lesion benignity or malignancy shall not be judged by size alone. A multi-dimensional evaluation incorporating basal morphology, anatomical location, mucosal echo and gallbladder inflammatory status is required to correct patient complacency and prevent missed diagnosis of premalignant lesions and occult early gallbladder carcinoma.

IV. Location-Based Differentiated Management Strategies

1. Gallbladder neck polyps

Located adjacent to the cystic duct outflow tract, neck polyps may compress the biliary tract, hinder bile drainage, and repeatedly induce bile stasis, chronic cholecystitis and biliary colic. All neck polyps require intensive monitoring regardless of size. Early surgical intervention is recommended for patients with recurrent abdominal pain and cholecystitis episodes.

2. Gallbladder fundus polyps

The gallbladder fundus is a high-incidence site for mucosal lesions with abundant blood perfusion, resulting in relatively higher risks of mucosal proliferation and carcinogenesis. For patients with irregular broad-based polyps suspicious for premalignant changes who

desire gallbladder preservation and meet surgical criteria, gallbladder-preserving polypectomy is performed to completely resect polyps and involved basal mucosa, achieving radical lesion eradication and organ preservation simultaneously.

V. Clinical Value and Positioning of Gallbladder-Preserving Polypectomy

Gallbladder-preserving polypectomy is a core minimally invasive procedure for the precise surgical management of gallbladder polyps. It represents an integrated clinical solution covering preoperative imaging assessment, intraoperative dual-endoscope visualization and postoperative pathological confirmation, fully complying with the principle of early tumor detection, diagnosis and treatment. This procedure thoroughly eliminates focal mucosal lesions, blocks polyp proliferation, mucosal dysplasia and malignant progression, and effectively prevents gallbladder carcinoma. Meanwhile, it preserves intact native gallbladder function and avoids long-term post-cholecystectomy complications including intractable dyspepsia, steatorrhea, gastroesophageal reflux and biliary tract injury.
Uniform In-Hospital Consensus: For all patients meeting surgical criteria, full laparoscopic gallbladder-preserving polypectomy is the preferred procedure provided the gallbladder has intact structure and satisfactory contractile function, no extensive lesions or absolute surgical contraindications, and the patient provides informed consent, voluntarily chooses gallbladder preservation, and commits to long-term standardized follow-up.
Conventional total cholecystectomy constitutes overtreatment for localized, benign gallbladder polyps with only focal mucosal involvement. Most gallbladder polyps are limited mucosal lesions while the gallbladder retains normal contractile and concentrating functions without diffuse inflammation or organic damage. Precise minimally invasive focal resection fulfills all clinical demands for cancer prevention, radical treatment and pathological diagnosis without organ resection.

VI. Full Laparoscopic Gallbladder-Preserving Polypectomy (Unified In-Hospital Standard Procedure)

The technical system, workflow and standards of gallbladder-preserving polypectomy are identical to those of

gallbladder-preserving cholecystolithotomy in our hospital. A dual-endoscope (laparoscope + rigid choledochoscope) three-port technique with fully closed intraperitoneal operation and no gallbladder exteriorization is adopted. Combined with nationally patented specialized gallbladder-preserving sheaths, this standardized minimally invasive technique is routinely promoted in our institution.

A. Surgical Indications

1. Preserved gallbladder function: gallbladder contraction rate ⩾ 30% on high-fat meal test (contraction assessment may be waived for patients with cystic duct obstruction caused by neck polyps accompanied by acute cholecystitis-like manifestations);
2. Qualified gallbladder morphology: no diffuse atrophy, extensive calcification or structural malformation;
3. Eligible lesions: broad-based polyps ⩾ 5 mm, polyps of any morphology ⩾ 10 mm, 5–9 mm polyps with documented progression during follow-up, or patients with severe cancer phobia;
4. Localized pathology: solitary or oligofocal polyps confined to partial mucosa without full-thickness gallbladder wall invasion;
5. Controllable inflammation: no acute suppurative, gangrenous or perforative severe cholecystitis;
6. No malignant evidence: preoperative imaging and intraoperative exploration exclude definite gallbladder malignancy;
7. Reliable patient adherence: patients acknowledge postoperative recurrence risks, voluntarily accept gallbladder-preserving surgery, and agree to long-term standardized follow-up.

B. Absolute Contraindications

1. Preoperative or intraoperative confirmation of polyp malignant transformation or invasive gallbladder wall carcinoma;
2. Severe gallbladder atrophy, extensive mural calcification or structural destruction and malformation;
3. Complicated acute suppurative, gangrenous cholecystitis or gallbladder perforation;
4. Severe cardiopulmonary diseases intolerant to general anesthesia and pneumoperitoneum, or other severe systemic comorbidities precluding surgical tolerance.

C. Relative Contraindications

1. Diffuse multiple gallbladder polyps incapable of complete focal resection;
2. Complicated Mirizzi syndrome or gallbladder wall thickness ＞ 5 mm;
3. History of biliary pancreatitis or severe cystic duct stenosis and obstruction;
4. Patients aged over 60 years with poor follow-up adherence and unwillingness to accept postoperative recurrence risks;
5. Diabetic patients with poorly controlled metabolism and irreversible impairment of gallbladder neural and contractile function, who carry extremely high risks of postoperative recurrence, infection and lesion progression. Cholecystectomy is preferred, and gallbladder-preserving surgery is strictly prohibited.

D. Standard Surgical Procedures (Full Laparoscopic Three-Port Technique)

1. After successful general anesthesia, pneumoperitoneum is established. A standardized three-port trocar setup is applied: one 1 cm umbilical observation port, one 0.5 cm subxiphoid main operating port, and one 0.5 cm right subcostal auxiliary port at the midclavicular line.
2. Comprehensive abdominal exploration is performed to assess gallbladder morphology, pericholecystic adhesion, polyp size, quantity, basal width and location, and screen occult micro-lesions and mucosal dysplasia.
3. Two traction sutures are placed at the gallbladder fundus, with external fixation via the auxiliary port to suspend and stabilize the gallbladder for optimal surgical exposure.
4. A 0.2 cm micro fenestration is created on the gallbladder fundus between the two traction sutures using electrocautery.
5. The auxiliary laparoscopic sheath is withdrawn, and a patented specialized gallbladder-preserving sheath is inserted through the fundus fenestration to establish a closed dedicated operative channel.
6. A rigid choledochoscope is inserted for full intracavitary visualization. Pedunculated polyps are completely enucleated. Broad-based high-risk polyps are resected together with surrounding affected mucosa to thoroughly eradicate lesions and eliminate residual diseased tissue. All polyp bases are coagulated using a miniature spherical electrode at 4–6 W for complete hemostasis. Occult polyps and mucosal dysplasia are screened intraoperatively to rule out malignancy.

7. Cystic duct patency is confirmed by continuous clear pale yellow bile outflow without debris or floccules.
8. Intraoperative cholangiography via the specialized sheath verifies cystic and common bile duct patency and excludes occult biliary obstruction and anatomical variation.
9. The gallbladder fundus fenestration is closed with layered absorbable sutures under laparoscopy to ensure watertight integrity and restore physiological anatomy.
10. The abdominal cavity is thoroughly irrigated and inspected for hemorrhage and bile leakage. The umbilical port fascia and peritoneum are closed with absorbable sutures, and all trocar wounds are sealed with skin adhesive without suture removal. No abdominal drainage is routinely placed.

E. Technical Advantages versus Conventional Cholecystectomy and Open Polypectomy

1. **Preservation of native organ function**: Retains physiological bile storage and concentration functions, preventing post-cholecystectomy dyspepsia, steatorrhea, gastroesophageal reflux and biliary injury.
2. **Superior minimally invasive cosmesis**: Only three tiny incisions are required with totally closed intraperitoneal operation, resulting in minimal trauma, reduced blood loss, mild postoperative pain and inconspicuous scarring.
3. **Precise and complete lesion eradication**: Dual-endoscope direct visualization detects micro-lesions missed by imaging and ensures complete resection of broad-based polyps and diseased mucosa, reducing recurrence rates.
4. **Accurate pathological diagnosis**: Establishes a complete diagnostic workflow including preoperative imaging, intraoperative visualization and postoperative pathology to differentiate benign, premalignant and early malignant lesions.
5. **High surgical safety**: Closed minimally invasive manipulation minimizes abdominal trauma and lowers the incidence of adhesion, hemorrhage and bile leakage.
6. **Rapid postoperative recovery**: Patients are ambulatory on postoperative day 1, discharged within 1–2 days, and resume daily activities rapidly.

F. Surgical Risks and Limitations

1. **Polyp recurrence**: Low recurrence risk is associated with individual mucosal metabolism, lifestyle and metabolic comorbidities,

which can be minimized via strict indication screening and standardized postoperative management.
2.**High technical requirements**: Gallbladder fenestration, precise lesion resection and thin-wall microsuturing demand advanced surgical proficiency and rich clinical experience.
3. **Restrictive indications**: This procedure is only applicable to patients with intact gallbladder morphology, preserved function and localized lesions, rather than all gallbladder polyp cases.

G. Standardized Postoperative Management (Core Anti-Recurrence Protocol)

1. **Dietary regulation**: Maintain regular three-meal daily intake with high-quality high-fat breakfast to stimulate gallbladder contraction, balanced nutrition, controlled caloric intake, alcohol abstinence and adequate hydration to prevent bile stasis and chronic mucosal irritation.
2. **Pharmacological intervention**: Individualized cholagogic and mucosal protective medications are prescribed to optimize bile metabolism and repair injured gallbladder mucosa, reducing pathological proliferative recurrence risk.
3. **Structured follow-up**: Abdominal ultrasonography is performed at 1, 3, 6 and 12 months postoperatively to monitor wound healing and mucosal status. Annual lifelong surveillance is recommended after stable recovery.
4. **Lifestyle modification**: Scientific weight control, stable glycemic and lipid regulation, and regular moderate exercise improve systemic metabolism and reduce mucosal proliferative triggers.

VII. Standardized Pathological Classification of Gallbladder Polyps (In-Hospital Diagnostic Consensus)

In accordance with national clinical and pathological standards, gallbladder polyps are classified into three categories to unify imaging, surgical and pathological decision-making.

A. Neoplastic Polyps (True Polyps, Including Premalignant and Malignant Lesions)

1. **Gallbladder adenoma**: A benign true neoplasm and established premalignant lesion, typically solitary, broad-based and large-sized, following the classic “adenoma–dysplasia–carcinoma” malignant

progression sequence and requiring surgical intervention upon meeting criteria.
2. **Gallbladder adenocarcinoma**: Malignant transformation of polyp lesions with mucosal and stromal invasion. Gallbladder-preserving surgery is contraindicated; cholecystectomy and radical oncological resection are mandatory.

B. Non-Neoplastic Polyps (Most Prevalent, Predominantly Benign)

1. **Cholesterol polyps**: Accounting for 60%–70% of all gallbladder polyps, these non-neoplastic lesions arise from cholesterol deposition and foam cell aggregation. Most are multiple and pedunculated without malignant potential. Asymptomatic low-risk patients receive surveillance; symptomatic or psychologically anxious patients may undergo gallbladder-preserving polypectomy.
2. **Gallbladder adenomyomatosis**: Invaginating proliferative lesions of Rokitansky–Aschoff sinuses, categorized as localized, segmental or diffuse. Localized lesions are mostly benign, whereas segmental and diffuse subtypes carry latent malignant risks requiring rigorous evaluation.
3. **Inflammatory polyps**: Benign reactive granulation hyperplasia induced by chronic cholecystitis and persistent bile irritation, managed by symptomatic treatment and surveillance.

C. Borderline Proliferative Lesions (High-Risk Premalignant Lesions)

Gallbladder epithelial dysplasia is graded as mild, moderate and severe. Mild and moderate dysplasias represent reversible premalignant states, while severe dysplasia is equivalent to pre-invasive carcinoma and constitutes the optimal indication for gallbladder-preserving focal resection to block carcinogenesis without cholecystectomy.

VIII. Unified Surgical Selection Criteria (In-Hospital Standard Consensus)

A. Preferential Indications for Full Laparoscopic Gallbladder-Preserving Polypectomy

This procedure is prioritized for patients with surgical-qualified polyps, preserved gallbladder contractile function, no extensive

mural atrophy, calcification or diffuse inflammation, no confirmed malignancy, localized lesions, voluntary gallbladder-preserving intention, informed surgical risks, and reliable long-term follow-up adherence.

B. Indications for Cholecystectomy

Cholecystectomy is indicated for confirmed malignant transformation, extensive gallbladder wall thickening and calcification, complete loss of gallbladder function, widespread unresectable multiple polyps, complicated Mirizzi syndrome, and poorly controlled diabetic patients with irreversible gallbladder dysfunction, who are ineligible for organ preservation.

IX. Conclusion (Promotable Core Specialty Concepts)

The core principles of this consensus are summarized as: size stratification, morphology supremacy, location differentiation, psychological consideration, pathological verification, precise minimal invasion, gallbladder preservation whenever feasible, and cholecystectomy only when necessary. Abandoning conventional crude one-size-fits-all management under strict safety and anti-cancer protocols, standardized full laparoscopic gallbladder-preserving polypectomy achieves radical lesion resection, precise pathological diagnosis and native organ preservation. This individualized, minimally invasive and long-term beneficial protocol serves as a replicable unified standard for hepatobiliary specialties and primary medical institutions.

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